MEMORANDUM

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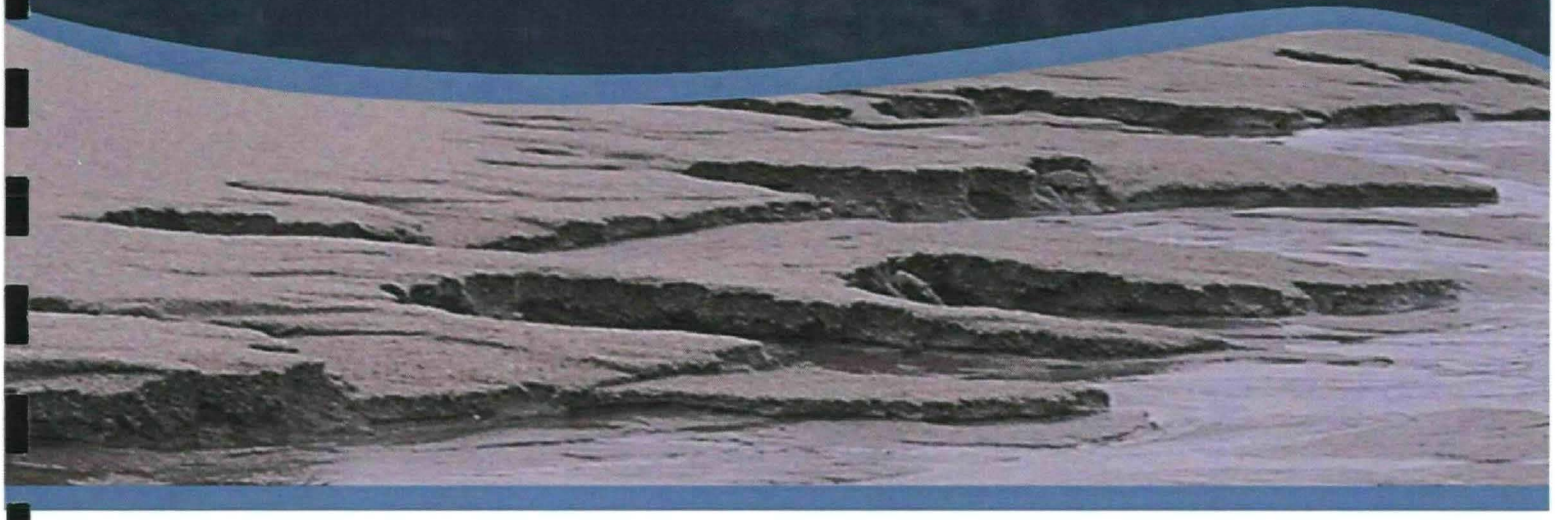

WORK PLAN FOR ADDITIONAL DESIGN SEDIMENT SAMPLING – EARLY ACTION AREA 4 ADJACENT TO JORGENSEN FORGE CORPORATION FACILITY

Prepared for

U.S. Environmental Protection Agency

Prepared by

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February 2011

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MEMORANDUM

To:	Shawn Blocker, U.S. Environmental Protection Agency	**Date:**	February 8, 2011
From:	David Templeton and Ryan Barth, P.E., Anchor QEA, LLC	**Project:**	080224-01.01
Cc:	Gil Leon, Earle M. Jorgensen Company Wayne Desberg, Jorgensen Forge Corporation Bill Joyce, Salter Joyce Ziker, PLLC Josh Lipsky, Cascadia Law Group, PLLC Peter Jewett and Amy Essig Desai, Farallon Consulting, LLC		
Re:	Work Plan for Additional Design Sediment Sampling – Early Action Area 4 Adjacent to Jorgensen Forge Corporation Facility		

INTRODUCTION

As discussed with the U.S. Environmental Protection Agency (EPA) during a January 27, 2011, meeting with Anchor QEA, LLC, and Farallon Consulting, LLC (Farallon), this memorandum provides the Work Plan for additional subsurface sediment sampling within a portion of Early Action Area 4 in the Lower Duwamish Waterway (LDW) adjacent to the Jorgensen Forge Corporation (Jorgensen Forge) Facility at 8531 East Marginal Way South, in Seattle, Washington (the Facility).

To support the design of the selected Engineering Evaluation/Cost Analysis (EE/CA) and directly-adjacent The Boeing Company (Boeing) remedies, this sampling will provide additional data on the nature and extent of concentrations of polychlorinated biphenyl (PBC) data in sediments. Anchor QEA requests that EPA approve this Work Plan with the understanding that the results of the proposed work will be incorporated into the design of the EPA-approved EE/CA Alternative 4. The design process for EPA's selected remedy will be defined in the Statement of Work (SOW) that will be attached to the amended or new Administrative Order on Consent (AOC) for implementation of the EE/CA remedy.

Background

EPA and Earle M. Jorgensen Company (EMJ) entered into a First Amendment to the AOC in April 2008. The First Amendment requires EMJ to prepare an EE/CA to conduct a non-time critical removal action (NTCRA) of sediments and associated shoreline bank soil adjacent to the Facility that contain concentrations of chemicals that exceed the Washington State Department of Ecology (Ecology) Sediment Management Standards (SMS) Sediment Quality Standard (SQS). EMJ and the Jorgensen Forge are currently developing the Final EE/CA based on discussions with and comments received from EPA on the Draft EE/CA and Second Draft EE/CA submitted in March 2009 and November 2010, respectively.

Submittal of the Final EE/CA to EPA is scheduled for early March 2011. Alternative 4 is the preferred alternative and includes the removal of the complete vertical and horizontal extents of sediments with Total PCB concentrations exceeding the SMS SQS criteria of 12 milligrams per kilogram (mg/kg) normalized for organic carbon (OC). EPA has defined this concentration as the removal action level (RvAL) for the NTCRA cleanup. A number of subsurface sediment core locations adjacent to the Facility contain Total PCB concentrations above the RvAL in the deepest sampling interval. To account for this data gap, Alternative 4 conservatively assumes that sediment removal at these core locations will occur to a design depth equivalent to approximately 130 percent greater than the bottom depth of the core. For example, several core locations contain Total PCB RvAL exceedances at 4 feet below mudline; the design dredge depth in these locations would be 4 feet multiplied by 130 percent, or 5.5 feet below mudline (rounded up to nearest half-foot).

Purpose

This memorandum includes the scope of work to collect subsurface sediment cores necessary to determine the bottom depth of sediment concentrations adjacent to the Facility that exceed the Total PCB RvAL. The validated analytical results will be received following submittal of the Final EE/CA and will be used to define the target dredge depths for the Alternative 4 during the remedial design process.

In addition, several sediment cores are proposed within the directly downstream Boeing Duwamish Sediment Other Area (DSOA; the remaining portion of Early Action Area 4) along both the in-water and toe of riprap cleanup boundaries of the EE/CA cleanup area.

The analytical results will provide Total PCB concentrations in sediments near these boundaries to confirm that the Boeing remedy within the DSOA removes the complete vertical extents of Total PCB RvAL exceedances.

WORK PLAN

EMJ and Jorgensen Forge previously collected sediment cores adjacent to the Facility using the sampling and analysis procedures identified in the EPA-approved *Second Draft Environmental Sampling Work Plan Addendum* (Work Plan Addendum; Anchor and Farallon 2005). The Work Plan Addendum included an attached Field Sampling Plan, Quality Assurance Project Plan, and Health and Safety Plan. The sampling and analysis activities in this Work Plan will be completed in accordance with the sampling and analysis procedures, quality assurance/quality control (QA/QC) protocols, and data quality objectives previously approved in the Work Plan Addendum documents. Anchor QEA will manage the field sampling, laboratory coordination, and data validation activities. The sampling and analysis procedures are briefly summarized in the following section.

Sampling and Analysis Procedures

Sixteen sediment cores are proposed at the station locations provided in Table 1 and depicted on Figure 1. These station locations are proposed and may change based on the field conditions (for example, presence of rip rap, accessibility, and weather conditions) encountered during field sampling. The core samples will be collected using a vibracore sampling device deployed from a Marine Sampling Services (MSS) vessel. All cores will be driven to refusal. Previous coring completed in the sampling vicinity documented debris at variable depths below mudline in the nearshore area. Due to the high probability of encountering debris, the core acceptance criteria will be based on 75 percent core recovery versus penetration depth. The penetration depth will be evaluated based on a combination of methods as described in the Work Plan Addendum (Anchor and Farallon 2005).

If 75 percent recovery is achieved, the core tube will be capped, labeled, adequately sealed to prevent leakage, and stored on ice until transfer to the processing crew. If less than 75 percent recovery is achieved during the first attempt, a second core will be collected at the same target location, if possible. The core with the highest percent recovery of the two attempts will be retained for sampling and analysis and the other core will be appropriately

disposed. During the coring operation, the penetration of the core pipe will be continuously monitored to identify the approximate depth where refusal was encountered, if applicable.

Logs and field notes of all core samples will be maintained as samples are collected and correlated to the sampling location map, and the core tubes will be decontaminated and handled using the procedures identified in the Work Plan Addendum (Anchor and Farallon 2005).

Core processing will be conducted at Analytical Resources, Inc., the laboratory that will complete the proposed sediment analyses. At the processing facility, cores will be opened, logged, and sub-sampled based on recovered length. Sub-sampling will occur using the following steps:

1. The aluminum core tube will be cut longitudinally using a circular saw or similar type device, taking care not to penetrate the sediment while cutting.
2. The description of the core sample will be recorded on a core log form for the parameters, as appropriate and present, identified in the Work Plan Addendum (Anchor and Farallon 2005).
3. The depth of recovered sediment will be recorded and the sediment will be scored at each successive 1-foot interval through the full penetration depth initiating at the mudline.
4. Sub-sampling for physical and chemical analyses from the scored core tube will occur using a tiered approach that targets identification of the deepest depth of Total PCBs RvAL exceedances in each core with archival and no further analyses at shallower depth intervals. This tiered approach may be modified but will generally be based on the following:
    a. If the deepest interval in the core beyond the last 1-foot score is greater than 0.5-foot thick, this entire interval will be sub-sampled using a clean spoon, placed into a cleaned stainless steel bowl, and homogenized using a clean stainless steel paddle and/or variable speed drill. Care will be taken to avoid the collection of sediment in contact with the sides of the core tube. A clean stainless-steel spoon will then be used to fill pre-labeled sample containers for analysis of total solids,

total organic carbon (TOC), and Total PCBs. Any additional volume remaining in the sample interval will be archived in a sample jar(s).

b. If the deepest interval in the core beyond the last 1-foot score is less than 0.5-foot thick, this entire interval will be sub-sampled with the immediately-shallower 1-foot interval. For example, if the bottom depth of the core is 7.3 feet below mudline, the bottom sample will extend from 6 to 7.3 feet below mudline. Sampling and analysis will be identical to Step 4a.
c. If the deepest interval Total PBC concentration is greater than 12 mg/kg PCBs OC, all shallower samples will not be submitted for analysis and be maintained on archive.
d. If the deepest interval Total PBC concentration is less than 12 mg/kg OC Total PCBs, the next shallowest 1-foot interval in the core will be sampled for the same analytes using the same procedures identified in Step 4a. This tiered analysis approach will continue until the Total PCB concentration exceeds 12 mg/kg OC Total PCBs or the 0- to 1-foot interval is analyzed.

Horizontal positioning and vertical elevations of the core stations will be determined using the procedures identified in the Work Plan Addendum (Anchor and Farallon 2005).

The core samples will be assigned a unique alphanumeric identifier according to the following method:

- The first three characters identify the sample location by the project descriptor: JVE = Jorgensen Vertical Extents
- The next two characters identify the sample station: -01 = Station 01
- The next two characters identify the sampling matrix: SC = sediment
- The next four characters identify the beginning and ending sampling interval: -XXYY
- The next six characters identify the collection date: -YYMMDD

For example, sample number JVE-320SC-0203-111602 indicates a core sample collected from Station 320 (co-located with the previously occupied station SD-320, shown on Figure 1) on February 16, 2011, with a subsurface sample collected from the 2- to 3-foot interval.

In accordance with the Work Plan Addendum (Anchor and Farallon 2005), field QA/QC samples will be collected and used to evaluate the variability resulting from sample handling and the efficiency of field decontamination procedures. Field duplicates (that is, homogenization duplicates) will be collected at a frequency of one per 20 sediment and soil samples. The field duplicates will be prepared by dividing aliquots of the homogenate during core processing into two distinct samples for the laboratory (the original sample and a duplicate). The samples will be processed in exactly the same way as the original sample and analyzed for total solids, TOC, and PCBs. In addition, one rinsate blank and one field blank will be collected. The rinsate blank will consist of rinsing down the sediment sampling and homogenization equipment after sample collection and decontamination with distilled water, and collecting the rinsate. The field blank will be collected by pouring distilled water directly in the sampling containers. The field blank samples will be analyzed for PCBs.

The field QA/QC samples will be assigned a unique alphanumeric identifier according to the following method:

- The first three characters identify the sample location by the project descriptor: JVE = Jorgensen Vertical Extents
- The rinsate blank samples will be followed with an -RB followed by the date in YYMMDD format
- The field blank samples will be followed with an –FB followed by the date in YYMMDD format
- The homogenization duplicate will be followed with –ZZSE-XXYY-YYMMDD where ZZ is the station number plus 50, XXYY is the sampling interval, and YYMMDD is the sampling date.

For example, sample number JVE-RB(FB)-100105 and DGS-266SC-0405-100105 represent a rinsate blank (field blank) collected on January 5, 2010, and a homogenization duplicate collected from Station 216 on January 5, 2010, from the 4- to 5-foot interval, respectively.

The sample containers, sample handling and storage, chain-of-custody forms, sample shipping, equipment decontamination, and disposal procedures for investigation derived waste (IDW) will be in accordance with Work Plan Addendum (Anchor and Farallon 2005). Based on SW-846 guidance (EPA 2007) revised since submittal of the Work Plan Addendum,

there is no recommended holding time for PCB analysis, so a longer holding time of 2 years will be used for frozen archived PCB samples.

The laboratory QA/QC program will be in accordance with the Work Plan Addendum (Anchor and Farallon 2005) except for a few minor revisions. The laboratory QA/QC protocols will include a second source calibration verification and daily laboratory control sample in lieu of a standard reference material. Ninety percent of the data will receive a Level III validation and 10 percent will receive a Level IV validation. If issues are encountered, a higher validation level may be performed on all data.

Results Reporting

The results will be incorporated into the design of the EPA-approved EE/CA Alternative 4 and presented during the design process. The design process will be described in the SOW attached to the amended or new AOC for implementation of the EE/CA remedy.

REFERENCES

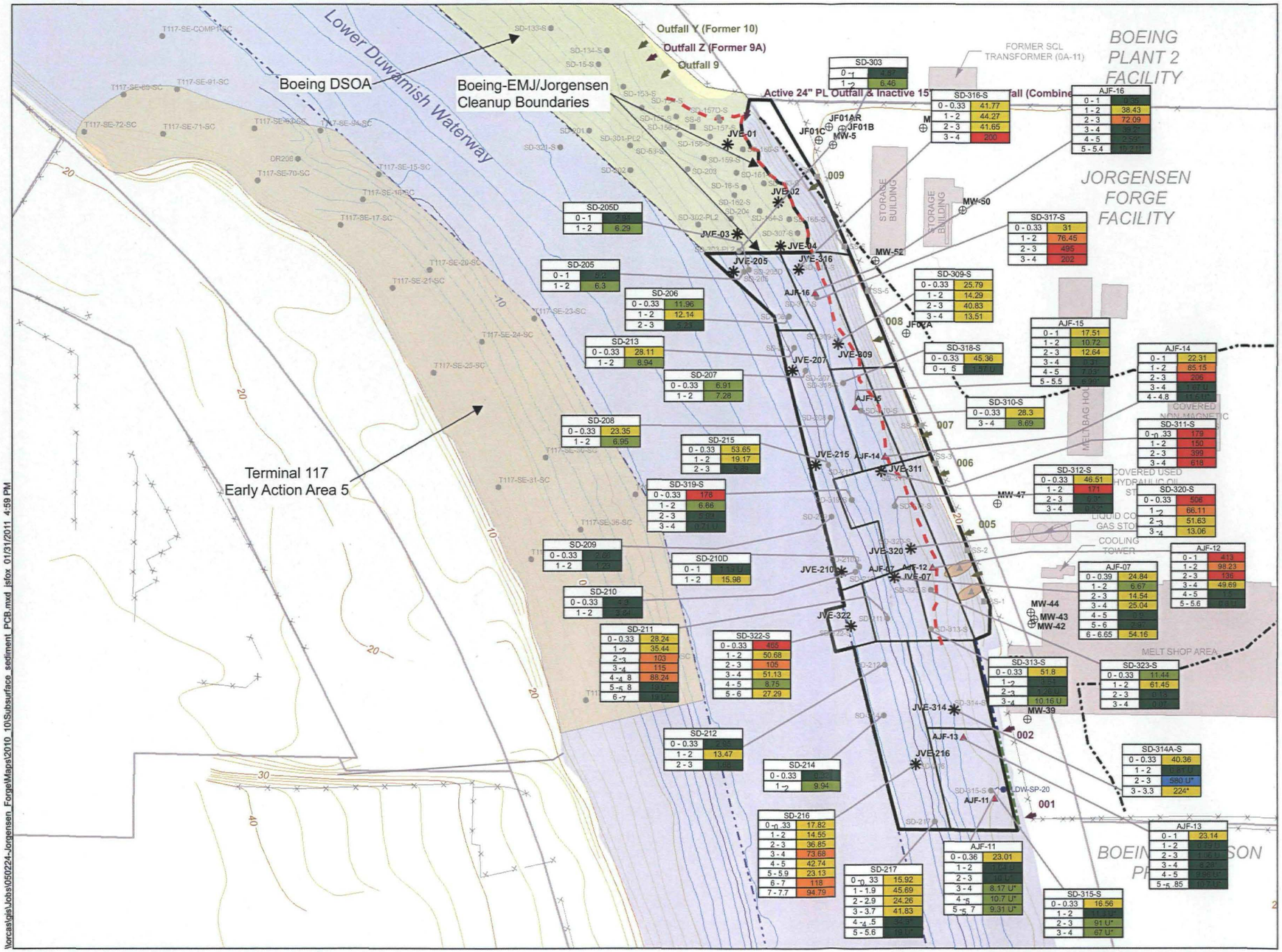
Anchor and Farallon (Anchor Environmental, LLC, and Farallon Consulting, LLC), 2005. Second Draft Environmental Sampling Work Plan Addendum. Prepared for Earle M. Jorgensen Company. April 2005.

EPA (U.S. Environmental Protection Agency), 2007. Test Methods for Evaluating Solid Waste. EPA document SW-846. Revision 6. February 2007.

LIST OF ATTACHMENTS

Figure 1 Proposed Subsurface Sediment Locations to Delineate Vertical Extents of Total PCB RvAL Exceedances

Table 1 Proposed Subsurface Sediment Geographical Locations



NOTES:

1. Sediment samples were OC-normalized and compared to SQS and CSL Total PCBs criteria. Sediment samples with TOC <0.5% or TOC >3% were not OC-normalized and were compared to LAET and 2LAET Total PCBs critera.

2. Bathymetry surveyed by Lower Duwamish Waterway Group (August 2003).

3. Outfall locations field identified on May 14, 2003.

4. Subsurface sediment data queried from LDWG Database and cooperative EPA and ACOE Triad Investigation results (Herrera & ACOE 2008) in January 2009.

5. The toe of the riprap slope, active 24-inch, and inactive 12-inch Boeing property line outfalls were surveyed during a low tide on August 28, 2008.

6. The Boeing-EMJ/Jorgensen cleanup boundaries is identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

7. Sediment Quality Standard (SQS) = 12 mg/kg-OC

8. Lower Apparent Effects Threshold (LAET) = 0.13 mg/kg

9. Cleanup Screening Level (CSL) = 65 mg/kg-OC

10. Second Lower Apparent Effects Threshold (2LAET) = 1 mg/kg

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Feet
0 50 100 150 200

Figure 1
Proposed Subsurface Sediment Locations to Delineate Vertical Extents of Total PCB RvAL Exceedances
Work Plan for Additional Design Sediment Sampling
Jorgensen Forge Facility

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Table 1
Proposed Subsurface Sediment Geographical Locations

Name	Northing (WA State Plane N, NAD83)	Easting (WA State Plane N, NAD83)	Latitude (NAD83)	Longitude (NAD83)
JVE-03	195683.34572200000	1275760.68693000000	47.52686891700	-122.30939136600
JVE-04	195672.00299100000	1275802.41202000000	47.52684002040	-122.30922163200
JVE-02	195713.12042400000	1275800.18398000000	47.52695260570	-122.30923384000
JVE-01	195767.60608600000	1275751.77478000000	47.52709940500	-122.30943397300
JVE-205	195647.92536500000	1275757.12765000000	47.52677200000	-122.30940300000
JVE-316	195650.00000500000	1275820.00000000000	47.52678063520	-122.30914874900
JVE-309	195580.00000500000	1275858.00000000000	47.52659076360	-122.30898953700
JVE-207	195554.64185400000	1275814.16647000000	47.52651900000	-122.30916500000
JVE-215	195465.90050700000	1275836.21802000000	47.52627700000	122.30906900000
JVE-311	195460.00000000000	1275899.00000000000	47.52626400010	-122.30881430700
JVE-320	195387.00000500000	1275927.00000000000	47.52606537960	-122.30869533300
JVE-210	195365.23155900000	1275861.23349000000	47.52600200000	-122.30896000000
JVE-07	195360.19854000000	1275911.45262000000	47.52599110000	-122.30875617000
JVE-322	195314.00000500000	1275870.00000000000	47.52586229160	-122.30892033300
JVE-216	195183.68300500000	1275931.55900000000	47.52550832980	-122.30866110900
JVE-314	195235.00000500000	1275968.00000000000	47.52565090410	-122.30851762400